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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/774,346	02/06/2004	Densen Cao	5125 P	5248

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EXAMINER	
MAY, ROBERT J	

ART UNIT	PAPER NUMBER
2875	

DATE MAILED: 10/23/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/774,346	CAO ET AL.	
	Examiner	Art Unit	
	Robert May	2875	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *24 July 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-22* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-22* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *24 July 2006* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Specification

The Brief Summary (Para 8) should be before the Description of the Drawings.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-3, 6, 8-9, 12-13, 15-16, 18-19, & 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hanley in view of Hochestein, Hartley and Koehler.

Regarding Claims 1 and 16, Hanley discloses in Figure 13 a light which could be used by a miner having forward illumination using semiconductor chips 1330 and a remote power source 1350 that is of a non-sparking nature so that the apparatus can be worn by a firefighter when entering flammable combustible environments (Col 10, Lines 38-42). Hanley fails to disclose a semiconductor chip mounted to heat sink comprising a primary, secondary, and dissipating heat sink with the secondary heat sink having an internal volume greater than the primary heat sink. Hochstein discloses in Figure 2, an LED 12 affixed to a primary heat sink 18 which is attached to a secondary heat sink 32 which is attached to a heat dissipating heat sink configured as fins 32 in order to maintain the light output of the LED package when the LED apparatus is used in critical situations where the reduction in luminous output can have dire consequences (Col 1,

Lines 38-43) such as within a flammable mine environment. Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the LEDs of Hanley's front illuminating fireman's helmet with the LED heat sink assembly of Hochstein so that illumination of the LEDs can be maintained in critical safety situations.

Regarding Claims 1, Hanley fails to disclose a wavelength shifting coating on the chip for converting the monochromatic light emitted to white light. Hartley discloses a flashlight wherein the LED is coated with a phosphor coating which acts to convert the emitted light to a white light (Col 14, Lines 1-3) in order to produce a white light for general illumination purposes. Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the LEDs of Hanley with a phosphor coating to produce a white light for general illumination purposes.

Regarding Claims 1, Hanley discloses a remote power source 1350 which is construed as a battery located on a remote location from the light source 1330 on the helmet, but fails to disclose this as a battery pack with a battery sealed within. Koehler discloses in Figures 1 & 6, a waterproof battery and lamp apparatus where the battery is sealed within case 15 so as to avoid exposure of the battery to a wet environment such as mining environment. Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the remote battery of Hanley with a battery pack sealing the battery within as disclosed by Koehler so as to prevent exposure of the battery to a wet environment such as a mining environment.

Regarding Claims 2 & 12, and 22, Hanley fails to disclose an airtight magnetic switch for activating the light source. Koehler discloses in Figures 1 and 6, an air and water tight switch mechanism a lighting apparatus having an electrically conductive ferromagnetic element shiftable in a capsule which shifts in response to the shifting of a magnetic switch (Col 2, Lines 48-52) that protects the circuitry from a wet environment such as within a mining environment. Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the switch of Hanley with magnetic switch of Koehler so that the circuitry is protected from a wet environment.

Regarding Claims 3 & 13, Hanley fails to disclose a device with a second remote battery pack. It would have been obvious to one of ordinary skill in the art to have a second remote battery pack as a backup power source to the first battery pack and since there is no new and unexpected result attributed to this 2nd battery pack, it is considered unpatentable see *In re Harza, 274 F.2d 669.*

Regarding Claims 6 & 15, Hanley fails to disclose a device with a heat sink assembly where there is heat conductive adhesive between the primary and secondary heat sinks. Hochstein discloses a heat sink for an LED with the heat sink assembly as recited in Claims 1 & 12 and the use of a conductive epoxy to bond the primary heat sink 18 to heat sink dissipater 30 as a practical means for thermally coupling heat sinks together (Col 5, Lines 13-16). Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to use thermally conductive adhesive coupling the heat sinks together as a practical means to do so.

Regarding Claims 8 & 18 Hanley fails to disclose the light source 1330 as being either (LED chips, LED Chip arrays, laser diodes, vertical cavity surface emitting lasers, VCSEL arrays, edge emitting lasers, surface emitting lasers and photon recycling devices. Hochstein discloses in Figure 2 an LED chip 12 that is suitable for mounting to a heat sink as disclosed. Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the LED of Hanley with the LED chip of Hochstein so that in can be mounted to a Heat sink surface.

Regarding Claim 9 and 19 Hanley fails to disclose heat sinks wherein one of said heat sinks includes material selected from the group consisting of copper, aluminum, silver, magnesium, steel silicon carbide, born nitride, tungsten, molybdenum, cobalt, chrome, Si, SiO2, SiC, AlSi, AlSiC, and diamond. Hochstein discloses using a plated copper diamond material for drawing heat away from an LED die (junction) to a heat dissipater to reduce the temperature and extend the life of the LED Package (Col 1, Lines 55-58). Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the device of Hanley with a heat sink assembly comprising copper plated diamond so that heat may be drawn away from the LED die (junction) to the heat dissipater.

Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hanley, Hochstein, Hartley and Koehler as applied to claim 3 above, and further in view of Parker (1,559,451). Hanley fails to disclose a strap for securing the battery packs on opposite sides of said helmet. Parker discloses in Figure 4, a device comprising a

battery 15 strapped to the helmet using a strap 17 that can strap the two batteries to opposite sides of the helmet. Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to have a strap as taught by Parker for strapping two batteries to opposite sides of the helmet.

Claims 5, 7,14, and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hanley, Hochstein, Hartley and Koehler as applied to claims 1 and 12 above, and further in view of Kish (US Pat 5,793,062). Hanley fails to disclose a reflector in the light module or a light reflective adhesive between the semiconductor chip and the primary heat sink. Kish discloses in Figure 2 a reflector comprising a silver loaded reflective epoxy which affixes an LED to a reflector cup in order to reflect the light from the LED's back surface and improve the intensity of the light (Col 3, Lines 65+). Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the integrated LED heat sink of Hanley, Hochstein, Hartley and Koehler with the reflector comprising a reflective epoxy of Kish in order to improve the intensity of the light emitted.

Claims 10-11 & 20-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hanley in view of Hochstein, Hartley and Koehler as applied to claims 1 & 12 above, and further in view of Singer. Hanley in view of Hochstein, Hartley and Koehler fail to disclose the chip as including epitaxial layer located on a substrate as claimed in

Clam 11 and furthermore this substrate material selected from the group consisting of Si, GaAs, GaN, ZnS, ZnSe, InP, Al2O3, SiC, GaSb, and InAs as required by Claim 10. Singer discloses a UV Blue LED-Phosphor device using GaN-based epitaxial structures who's advent allowed for the first time the possibility to generate White light from LEDs by applying luminescent phosphor materials on top of the LED Col 1, Lines 20-25). Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the chip of Hanley in view of Hochstein, Hartley and Koehler with the GaN based epitaxial substrate of Singer so that white light may be generated from LEDs.

Response to Arguments

Applicant's arguments filed 24 July 2006 have been fully considered but they are not persuasive.

In response to applicant's arguments, the recitation "sparkless mining light" has not been given patentable weight because the recitation occurs in the preamble. A preamble is generally not accorded any patentable weight where it merely recites the purpose of a process or the intended use of a structure, and where the body of the claim does not depend on the preamble for completeness but, instead, the process steps or structural limitations are able to stand alone. See *In re Hirao*, 535 F.2d 67, 190 USPQ 15 (CCPA 1976) and *Kropa v. Robie*, 187 F.2d 150, 152, 88 USPQ 478, 481 (CCPA 1951).

In response to applicant's argument that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case Hochstein discloses a heat sink for an LED to maintain the light output of the LED which is seen to apply to many instances where illumination takes place using an LED including hazardous situations such as a mining environment.

In response to the applicant's argument regarding the use of Hartley, the Examiner disagrees with the applicant's assertion that it teaches away from a sparkless configuration because Hartley places the battery adjacent the light module rather than in a remote location. While the Examiner does agree that Hartley does not teach a remote positioning of the battery, this does not defeat Hartley as being combinable with Hanley because Hanley already teaches the remote positioning of the battery and Hartley teaches the use of a phosphor coating acting to convert the emitted light to a white light for general illumination purposes which includes illumination within a mining environment.

The applicant asserts that there is no suggestion in the pertinent field to seek out a primary and secondary heat sink combination chip to produce a sparkless mining light with remote battery. However Hanley does teach the need for non-sparking type of light

source where the light source would be used in a highly combustible environment (Col 10, lines 38-43) and one of ordinary skill in the art would have looked to methods of controlling and dissipating heat generated by the light source in such an environment.

In response to applicant's argument that Koehler is nonanalogous art, it has been held that a prior art reference must either be in the field of applicant's endeavor or, if not, then be reasonably pertinent to the particular problem with which the applicant was concerned, in order to be relied upon as a basis for rejection of the claimed invention. See *In re Oetiker*, 977 F.2d 1443, 24 USPQ2d 1443 (Fed. Cir. 1992). In the present case Kohler teaches that headlamps have been used in the art for illuminating the work area of the miner (Col 1, lines 12-14) and a battery which is sealed ~~and~~ protects the circuitry or battery when used in a wet type of environment. This is clearly applicable in the field of the applicant's endeavor being a mining environment, which is known to be a damp or wet type of environment.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Robert May whose telephone number is (571) 272-5919. The examiner can normally be reached between 9 am– 5:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Sandra O'Shea can be reached on (571) 272-2378. The fax number for the organization where this application or proceeding is assigned is (571) 273-8300 for all communications.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval PAIR system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

RM

10/2/06

RENEE LUEBKE
PRIMARY EXAMINER